Premenstrual syndrome and dysmenorrhea status before and after practicing yoga among selected women of reproductive age group living in Kathmandu valley: A mixed method study

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ABSTRACT

Introduction: Premenstrual syndrome and dysmenorrhea are most common gynecological disorders associated with reduced quality of life among women of reproductive age. This study aims to compare the premenstrual syndrome and dysmenorrhea before and after practice of yoga among women of reproductive age living in Kathmandu, Nepal. Surya Namaskar, Surya Kriya and Shambhavi Mahamudra were common yoga types practiced by participants.

Method: A retrospective pre-post study with concurrent mixed method design was used. Study respondents were 41 women of reproductive age. Numeric pain rating scale and Premenstrual syndrome scale were used for quantitative data collection. Interview guide was used for the qualitative data collection. Google form was used for quantitative data whereas telephone was used for an in-depth interview. R-4.2.1 software was used for the quantitative data analysis. Qualitative data was analyzed using Braun and Clarke's 6-steps thematic analysis in RQDA 0.3.8.1 package of R software. Qualitative findings were triangulated with quantitative findings to determine convergent, divergent and expansive findings.

Result: All outcome variables pain intensity score (Baseline: 6.46±2.31, Endline: 3.71±2.24, $p<0.0001$), pain duration in hour (Baseline: 6, Endline 2.5, $p<0.0001$) and premenstrual syndrome score (Baseline: 104.73±33.28, Endline: 74.24±22.08, $p<0.0001$) were significantly different after practice of yoga as compared to before yoga practice. Qualitative findings supported the quantitative result and presented expansive finding as yoga may be beneficial for management of irregular menstrual cycles and polycystic ovarian syndrome as well.

Conclusion: The study suggests yoga may help in alleviating premenstrual syndrome and dysmenorrhea.

Keywords: Premenstrual Syndrome, Dysmenorrhea, Menstrual Disorder, Yoga, Nepal

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INTRODUCTION

Pre-menstrual syndromes and dysmenorrhea are the most common menstrual problems that women of reproductive age are suffering.[1] Premenstrual syndrome (PMS) is a common cyclic disorder that occurs in women of reproductive age during the luteal phase of the menstrual cycle, mostly affecting 1-7 days before menstruation.[2] Dysmenorrhea is defined as a painful period that may occur with severe menstrual cramps during or before the onset of menstruation.[3] PMS severely impacts the daily activity of young women, especially students which may cause significant anxiety.[1] PMS affects students' social life, academic performance, work performance, and emotional well-being and these are associated with the risk of depression and suicide.[4] Pain is an important factor for low Quality of Life (QOL). Women suffering from dysmenorrhea also report significantly reduced QOL due to body pain, general health conditions as well as physical and social functioning.[5] If PMS is very severe then they also interfere with the overall quality of life. Drugs such as anti-depressants or diuretics are used commonly to treat mood disorders or to reduce fluid buildup but they consist of side effects.[6] Study suggests pharmacological treatments of dysmenorrhea are not effective for addressing quality of life and are not an appropriate choice for all women due to possible contraindications, potential adverse effects, individual preference, and variation in effective management of symptoms.[5]

Yoga is a psycho-physiological system of therapy that aims to harmonize the body and mind resulting in improved physical, mental, and spiritual health. It is an integrated lifestyle approach focused on a healthy diet (*Swasth Aahar*), physical postures (*Asanas*), meditation (*dhyana*), specific breathing techniques (*Pranayamas*), and purificatory acts (*Kriyas*).[7] Many studies have suggested that Yoga has a positive impact on the reduction of dysmenorrhea and pre-menstrual symptoms.[8-9] Though some studies suggest yoga has a positive impact on the reduction of pre-menstrual symptoms and menstrual pain due to dysmenorrhea there are no such studies in Nepal to compare the status of PMS and dysmenorrhea before and after the practice of yoga. This study aims to fulfill that gap.

METHOD

A retrospective pre-post study with concurrent parallel mixed method design was used to compare the pre-menstrual symptoms and dysmenorrhea among yoga practicing women of reproductive age group residing in Kathmandu valley, Nepal. Researchers contacted to various yoga studios of Kathmandu to identify participants of the study. After identifying few participants snowball method was used to get more respondents from initially identified participants. The study duration from the collection period was one and a half weeks, which was from 1st June 2022 to 30th June, 2022. Validated Numeric Rating Scale with Visual Analog scale was used to measure the menstrual pain intensity whereas validated PMSS was used to measure the PMS score. For an exploration of experiences in-depth interview guide was used as part of the qualitative method. The core components of yoga included meditation, physical postures (asanas), and breathing exercises (pranayama) and their different combinations. Yoga-asanas, Surya Kriya: A slower version of Surya Namaskar with specific breathing pattern and Shambhavi Mahamudra: A package of Inner Engineering program designed by Isha Yoga Center, Coimbatore, Tamil Nadu, India were the major yoga methods being practiced by participants. The sample size was 41 for the quantitative survey using the snowball sampling method whereas 4 In-depth interviews were conducted for the qualitative method purposively. Online google form was used for quantitative data whereas telephone interview was used for an in-depth interview. Easy R software was used for the analysis of quantitative data. Paired t-test and Wilcoxon's signed rank test were performed to measure the change before and after the practice of yoga. Qualitative data was analyzed using 6 steps thematic analysis process given by Braun and Clarke using RQDA software. Qualitative findings were triangulated with quantitative findings to determine convergent, divergent and expansive findings. Informed consent was taken from the respondents during data collection. Consent was taken from participants.

RESULT

Since the study was a mixed method study result is presented with quantitative and qualitative findings. In the first section, qualitative findings are presented. In the second section quantitative finding is triangulated with qualitative findings using the convergent, divergent and expansive approach.

Quantitative Findings

Median age of respondents was 28.12±6.92, median age at menarche was 12.92±1.16 and mean body mass index (BMI) was 21.32±2.45. As age and age at menarche were not distributed normally median was calculated whereas BMI was

distributed normally hence its mean is reported. Presence of pain among women was assessed before and after yoga practice. There is no significant difference in presence of pain before and after the practice of yoga (Table 1). Severity of pain intensity was decreased among 87.7% of respondents, increased in 3.57% and no change among 10.71% of respondents after practice of yoga. Pain intensity was also categorized on the basis of severity. Before yoga practice 46.42% has severe pain intensity and 42.85% had moderate pain intensity but after practice of yoga only 10.71% had severe pain intensity and 25% had moderate pain intensity (Table 2). PMS was also categorized into severity on the basis of severity. Before yoga practice 7.31% had very severe PMS and 29.26% had severe PMS but after practice of yoga none had very severe and severe PMS (Table 3).

Main outcomes are pain intensity score, pain duration and PMS score. Pain intensity and PMS score were distributed normally hence mean was calculated and paired t-test was used. Pain duration was not normally distributed hence median was calculated and Wilcoxon's signed rank test was used. All 3 outcomes that are pain intensity score, pain duration and PMS score are significantly different ($p<0.0001$) after practice of yoga as compared to before yoga practice (Table 4).

Table 1. Two-way table of dysmenorrhea before and after yoga practice (N=41)

Characteristics	Yes (%)	No (%)
Presence of pain before yoga practice	28 (68.29)	13 (31.71)
Presence of pain after yoga practice	27 (65.85)	14 (34.15)

X-squared = 0.0552, df = 1, p-value = 0.814

Table 2. Distribution of respondents on the basis of severity of pain intensity (N=28)

Pain intensity (Score)	Before (%)	After (%)
Mild (1-3)	3 (10.71)	18 (64.28)
Moderate (4-6)	12 (42.85)	7 (25)
Severe (7-10)	13 (46.42)	3 (10.71)

Table 3. Distribution of respondents on the basis of severity of PMS (N=41)

PMS (Score)	Before (%)	After (%)
Mild (40-80)	12 (29.26)	26 (63.41)
Moderate (80-120)	14 (34.14)	15 (36.58)
Severe (120-160)	12 (29.26)	0 (0)
Very Severe (160-200)	3 (7.31)	0 (0)

PMS=Premenstrual syndrome

Table 4. Comparison of outcome before and after practice of yoga

Characteristics	Average score±SD/IQR		P-value	Performed test
	Before	After		
Pain Intensity Score (n=28)	6.46±2.31	3.71±2.24	<0.0001	Paired t-test
Pain duration* (n=28)	6 (3.25 – 24)	2.5 (1 – 6)	<0.0001	Wilcoxon's signed rank test
PMS score (n= 41)	104.73±33.28	74.24±22.08	<0.0001	Paired t-test

*Median (IQR). PMS=Premenstrual Syndrome, SD=Standard Deviation, IQR=Interquartile Range

Qualitative Findings

Five major themes were identified after analyzing 4 in-depth interviews. 3 IDI were taken with those who experienced decreased pain and 1 IDI with who experienced increased pain after yoga practice.

Convergent Findings

Quantitative findings showed significant decrease in pain intensity after practice of yoga which is supported by qualitative findings too.

"Also, after doing Shambhavi drastic change was happened in period pain. Still pain happens once in 3-4 months and also may depend upon stress level, but the butterfly practice that we do in Shambhavi does great help."

- 24-year-old, Female, Student

"Yeah, my main problem was my menstruation cycle was irregular and pain also used to occur before menstruation, still it hurts but comparatively it feels much tolerable."

- 23-year-old, Female, Student

Divergent findings

Though most of the participants experienced decrease in pain intensity but 1 participant experienced increase in pain and 3 participants didn't experience any change.

"Actually, my pain problem was from menarche. […] Later I started doing Surya Kriya and Shambhavi practice but my pain has increased, don't know if it is because I am not doing practice correctly or what so I have to use medicine. […] I have also gained weight, 3-4 kg weight. […] and it may be because of food too."

-31-year-old, Female, Manager

Expansive findings

In qualitative along with decreased pain intensity and psychological benefits respondents shared that they get regular periods after practice which used to be so much irregular. Also, few participants reported positive impact in reduction of severity of polycystic ovarian syndrome.

"There's saying that it should happen at interval of 28 days right, so in lockdown after regularly practicing yoga for 3 consecutive months it actually happened in 28-28-28 days and then again, I started to go to office, college and again it was like off the track and now again I am working on it."

- 22-year-old, Female, Architectural Engineer

"I did yoga and meditation and also improved my food habit then magically within 40-48 days I lose 10kg of weight naturally. It was too fast to lose 10 kg weight in 40 days that is also natural. Before that, I used to get a period of 2 months after that my cycle used to happen in 30-33 days. Then I continued my practice and slowly my PCOD also got cured."

- 24-year-old, Female, Student

"Yeah, my main problem was my menstruation cycle was irregular and pain used to occur before menstruation…and now period is regular as compared to before. My normal cycle was of 45 days and it used to happen once in 2-3 months but after practice again it started to happen exactly in 45 days."

- 23-year-old, Female, Student.

Table 5. Themes and codes

Themes	Codes
Effect of menstrual symptoms	Effect on work life
	Most affected events
	Perceived effects of PCOD
Management of symptoms	Accepting symptoms
	Management of pain
	Managing Mood Swings
	Sleep as medicine
	Venting out of anger
Change after Yoga	Change in pain intensity
	Change in irregular menstrual cycle
	Duration took to notice change
	Change in attitude towards symptoms
	Change in PCOD after practice
Food habit and menstruation	Food habit and menstrual problem
	Milk product and menstrual status
	Perception of food affecting menstrual status

DISCUSSION

In this present study pain intensity during menstruation, pain duration and PMS score are found significantly decreased among selected women of reproductive age group after practicing yoga for at least 3 months. This study is a retrospective pre-post study where similar questions were asked to the respondents in two sections, in first section to know the status before practicing yoga and in the second section to know the status after practicing. The study published in 2021 conducted by Nurcan Kirca, et. al was a randomized control trial among 60 students to assess the the pain level in primary dysmenorrhea through providing intervention for 12 weeks, showed that there is statistically difference in pain in experimental group and statistically not significant difference in control group.[10] Another study conducted by Nirav Vagela, et. al in 2019 to compare the effects of aerobic exercise and yoga on Premenstrual syndrome(PMS) using VAS and PMS scale with randomized trial in 72 participants

with convenience sampling, in which intervention was 40 min per day, 3 times per week for 1 month found that reduction in PMSS by aerobic exercise mean±SD is 33.11±17.9 and reduction by yoga mean±SD was 44.44±23.54 (p value 0.02*).[11] Another single blind RCT conducted in Republic of Korea among 40 randomly selected undergraduate nursing students with primary dysmenorrhea to find out the effect of yoga on menstrual cramps and menstrual distress found that after 60 minute practice once a week for 12 weeks, yoga group had significantly decreased menstrual distress score compared with the control group (between-group difference, -1.13; 95% CI, -1.43 to -0.82; p<0.0001) after yoga practice.[12] Similarly another randomized control study done in 2011 by MS Zahra Rakhshaee, et. al among 120 girls of age 18-22 years using VAS found that after 2 month test there were significant differences in pain intensity with using Friedman test and in pain duration using with repeated measure ANOVA test in the two post-tests compared with the pretest (P=0.000). Also, after doing yoga in second month, pain intensity and pain duration reduced more with comparison to the first month.[13] One meta-analysis has showed that the overall effect size of the impact of a yoga program on menstrual pain in primary dysmenorrhea was high with a standardized mean difference of −2.09 (−3.99 to −0.19) (p = 0.031) among the effect sizes of the 4 trials (95% confidence interval).[14]

This study has also found expansive finding through qualitative method which suggests that yoga practice may help to cure PCOD, though it is not comparable because of different method one RCT conducted by Ram Nidhi et. al in 2013 to find out the effects of a holistic yoga program on endocrine parameters in adolescents with Polycystic Ovarian Syndrome in Andra Pradesh, India showed that there is change in Anti-mullerian hormone (AMH) (Y = - 2.51, C = - 0.49, p = 0.006), luteinizing hormone (LH), and LH/FSH ratio (LH: Y = - 4.09, C = 3.00, p = 0.005; LH/FSH: Y = - 1.17, C = 0.49, p = 0.015) as well as testosterone (Y = - 6.01, C = 2.61, p = 0.014) were significantly different between the two intervention groups after 12 week of intervention where practice was for 1 hour per day.[15]

Random sampling method and the small sample size were the major limitations of the study. Another limitation is that there may be recall bias as the study is retrospective in nature and the study has not defined any time frame in inclusion criteria nor has assessed it through a questionnaire. But one assumption is that people can easily recall painful moments and one strength is that it is supported or validated by qualitative findings through the in-depth interview which suggests that the response may not be the recall bias. However, we cannot generalize the finding as it is not a robust research design and needs to interpret the findings cautiously.

CONCLUSION

This mixed method study suggests that yoga may help in the reduction of pain intensity during menstruation, as well as it may reduce the duration of pain and alleviate pre-menstrual symptoms. It also suggests it may help to get a regular period for those who are suffering from irregular menstruation even though it may cure extreme menstrual disorders like PCOD. Further, more robust study designs or experimental research are required to validate the findings of this study.

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REFERENCES

1. Dangal G. Menstrual disorder in adolescents. J Nepal Med Assoc JNMA. 2004;43(153):152-63. | DOI | PDF |
2. Dickerson LM, Mazyck PJ, Hunter MH. Premenstrual syndrome. Am Fam Physician. 2003;67(8):1743-52. | Google Scholar | PDF |
3. French L. Dysmenorrhea. Am Fam Physician. 2005;71(2):285-91. | Google Scholar | PDF |
4. Mandell AJ, Mandell MP. Suicide and the menstrual cycle. JAMA. 1967;200(9):792-3. | PubMed | Google Scholar |
5. McGovern CE, Cheung C. Yoga and quality of life in women with primary dysmenorrhea: a systematic review. J Midwifery Womens Health. 2018;63(4):470-82. | DOI | Google Scholar |
6. Tsai FH, Chu IH, Lin TY, Liang JM, Hsu HT, Wu WL. Preliminary evidence on the effect of yoga on the reduction of edema in women with premenstrual syndrome. Eur J Integrat Med. 2017;9:63-8. | DOI | Google Scholar |
7. Archana SD. Effect of Surya Namaskar in primary dysmenorrhea [Dissertation]. Chennai: Government Yoga and Naturopathy Medical College and Hospital, 2018. | Weblink | Google Scholar |
8. Pal A, Nath B, Paul S, Meena S. Evaluation of the effectiveness of yoga in the management of premenstrual syndrome: a systematic review and meta-analysis. J Psychosom Obstet Gynecol. 2022;43(4):517-25. | DOI| Google Scholar |
9. Ko HN, Le SS, Kim SD. Effects of yoga on dysmenorrhea: a systematic review of randomized

controlled trials. Altern Integrat Med. 2016;5(4):1-5. | DOI | Google Scholar | PDF |
10. Kirca N, Celik A. The effect of yoga on pain level in primary dysmenorrhea. Health Care Women Int. 2021:1-20. | DOI | Google Scholar |
11. Vaghela N, Mishra D, Sheth M, Dani VB. To compare the effects of aerobic exercise and yoga on premenstrual syndrome. J Educ Health Promot. 2019;8:199. | DOI | Google Scholar | PDF |
12. Yang NY, Kim SD. Effects of a yoga program on menstrual cramps and menstrual distress in undergraduate students with primary dysmenorrhea: a single-blind, randomized controlled trial. J Altern Complement Med. 2016;22(9):732-8. | DOI | Google Scholar |
13. Tsai SY. Effect of yoga exercise on premenstrual symptoms among female employees in Taiwan. Int J Environ Res Public Health. 2016 Jul;13(7):721. | DOI | Google Scholar |
14. Kim SD. Yoga for menstrual pain in primary dysmenorrhea: A meta-analysis of randomized controlled trials. Complement Ther Clin Pract. 2019;36:94-9. | DOI | Google Scholar |
15. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Effects of a holistic yoga program on endocrine parameters in adolescents with polycystic ovarian syndrome: a randomized controlled trial. J Altern Complement Med. 2013;19(2):153-60. | DOI | Google Scholar |